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**ON CHAETOGNATHS AND APPENDICULARIANS COLLECTED
BY MR. Z. SAGARA IN THE ARAFURA SEA IN
MAY-AUGUST 1955¹⁾**

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With a Chart and 2 Tables

By courtesy of Mr. Z. SAGARA of the Tōkai Regional Fisheries Research Laboratory, a chance was bestowed fortunately on me to examine fifty-five plankton samples collected by him in the Arafura Sea during his oceanographical observation in the period from the end of May to the beginning of August 1955. These samples were hauled by a modified HENSEN's net in miniature, 10 cm in diameter of the mouth, 25 cm in the maximum diameter, 90 cm in length and stretched with MÜLLER's gauze No. 13 (ca. 130 meshes per square inch), from the bottom to the surface at stations shown in Chart 1. The situation of stations, date and time of each sampling and some other data concerning the water of the surveyed area are given at the end of this article, where the haul distance does not mean the depth at respective stations, because the rope may very often be stretched obliquely.

Of these samples, chaetognaths and appendicularians were selected out and identified by myself, while other plankton organisms were submitted to respective specialists for their close examination. In the following, the results of my examination on the two animal groups are given in the form of tables, with some brief notes. Before going further I wish to express my hearty thanks to Mr. Z. SAGARA for his kindness.

I. Chaetognaths

Only nine species were found in the following proportion. Their occurrence is shown in detail in Table 1.

Species	Number of Individuals	Percentage
1. <i>Sagitta enflata</i>	440	34
2. <i>Sagitta bipunctata</i>	1	
3. <i>Sagitta robusta</i>	42	3
4. <i>Sagitta bedoti</i>	161	13

1) Contributions from the Seto Marine Biological Laboratory, No. 277.

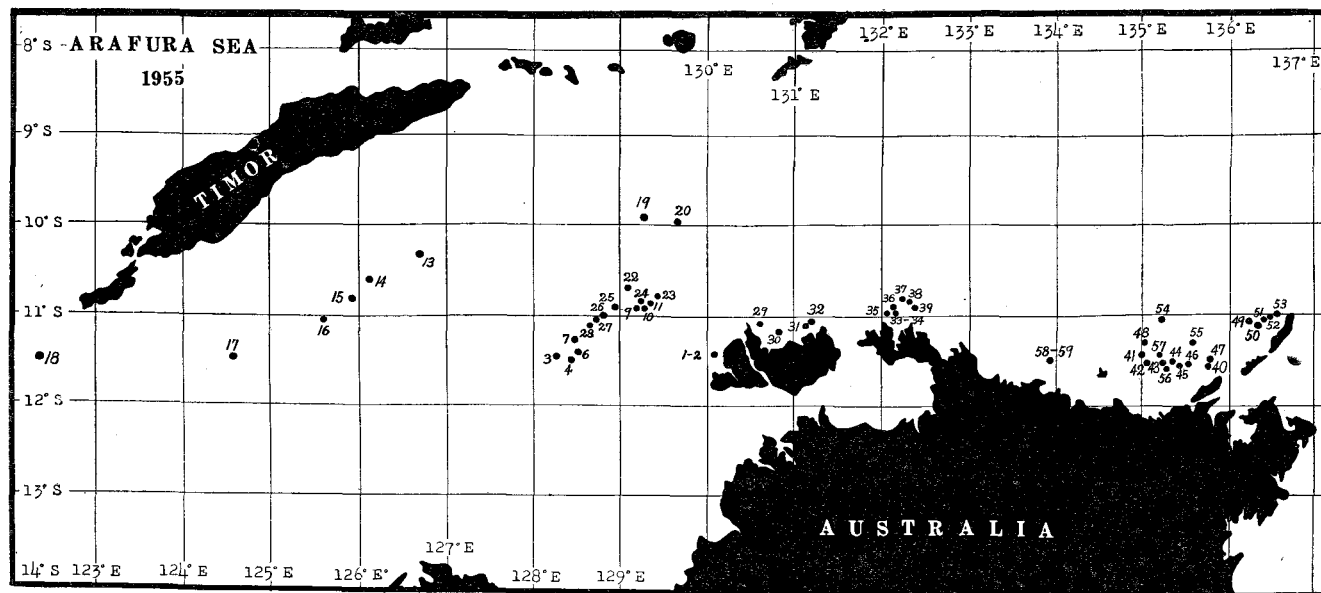


Chart 1. Map showing stations of sampling.

5. <i>Sagitta serratodentata pacifica</i>	6	
6. <i>Sagitta neglecta</i>	46	4
7. <i>Sagitta regularis</i>	9	1
8. <i>Pterosagitta draco</i>	1	
9. <i>Krohmitta pacifica</i>	181	14
10. Damaged individuals or juv.	374	30
		<hr/>
		1261

Sag. enflata is the commonest species and is followed by *Sag. bedoti* and *Ktta. pacifica*. The absence of *Sag. hexaptera* and the rareness of *Sag. serratodentata* are considered to be due to the shallowness of the surveyed area where the water was considered, in the period of observation, as being the same as that of the surface layer of the open and deep ocean and quite free from any water masses up-welled from the depth. The universal occurrence of *Sag. bedoti* is a characteristic in warm coastal waters of the Indian Ocean and the Malay Archipelagoes, and that of *Ktta. pacifica* and the scarcity of *Pterosag. draco* were observed also during the survey made by Mr. S. WADA in 1938.¹⁾ Many juvenile individuals, of *Ktta. pacifica* were found in the present material. The water at Stations 13-18 off the southern coast of Timor was clearly much more oceanic than at other stations and samples hauled at these stations contained only a few number of chaetognaths, including no individual of *Sag. bedoti*.

II. Appendicularians

The following 19 species were detected in the material, the detail of the occurrence of respective species is given in Table 2.

Species	Number of Individuals	Percentage
1. <i>Oikopleura longicauda</i>	1714	52
2. <i>Oikopleura fusiformis</i>	107	3
3. <i>Oikopleura fusiformis</i> f. <i>cornutogastra</i>	326	10
4. <i>Oikopleura intermedia</i>	13	
5. <i>Oikopleura dioica</i>	68	2
6. <i>Oikopleura rufescens</i>	383	12
7. <i>Oikopleura parva</i>	1	
8. <i>Oikopleura cophocerca</i>	30	1
9. <i>Oikopleura</i> spp. (damaged)	84	3
10. <i>Megalocercus huxleyi</i>	6	
11. <i>Stegosoma magnum</i>	5	

1) TOKIOKA, T. (1942): Systematic studies of the plankton organisms occurring in Iwayama Bay, Palao, III. Chaetognaths of the bay and the adjacent waters. Palao Trop. Biol. St. Stud., II (3).

12. <i>Fritillaria haplostoma</i>	32	1
13. <i>Fritillaria abjornseni</i>	3	
14. <i>Fritillaria arafaera</i>	1	
15. <i>Fritillaria formica</i> f. <i>digitata</i>	4	
16. <i>Fritillaria pellucida</i>	2	
17. <i>Fritillaria borealis</i> f. <i>sargassi</i> (large individual)	5	
17a. " " (small individual)	374	11
18. <i>Fritillaria</i> spp. (damaged)	2	
19. <i>Tectillaria fertilis</i>	1	
20. <i>Appendicularia sicula</i>	155	5
21. <i>Kowalevskia tenuis</i>	1	
<hr/>		
3317		

Oik. longicauda is the dominant-most species of all and *Oik. fusiformis* f. *cornu-togastra*, *Oik. rufescens* and *Frit. borealis* f. *sargassi* (small individual) follow it. *App. sicula* occurs commonly, but not in abundance. *Oik. fusiformis*, *Oik. dioica* and *Frit. haplostoma* occur less frequently and much sparsely. *Oik. cophocerca* was confined in the present survey to the area west to 129°14'E. The number of species was more numerous at Sts. 13-18 than at others. Rather universal occurrence of *Oik. dioica*, though in a small number, seems to show distinctly that the water of the surveyed area is considerably of a neritic nature.

Station Number	Situation	Date	Time	Haul Distance	Surface Temp.	Bottom Temp.	Transparency	Water Colour
1	11°25'S 130°04'E	May 29	12h 10'	20.5m	29.0C	28.4C	2.8m	8
2	11°25'S 130°04'E	30	12h	20.0	29.2	28.4	6.0	9
3	11°26'S 128°16'E	June 2	14h 20'	40.0	29.2	28.5	10.0	7
4	11°28'S 128°26'E	3	8h 5'	33.0	28.4	28.6	11.0	7
6	11°25'S 128°29'E	3	13h 15'	36.0	28.8	28.8	14.0	7
7	11°18'S 128°28'E	3	15h 30'	37.0	28.8	28.4	15.0	7
9	10°58'S 129°08'E	4	8h 15'	35.0	28.6	28.5	12.0	8
10	10°58'S 129°12'E	4	12h	35.0	28.6	28.6	10.0	8
11	10°56'S 129°14'E	4	16h 5'	33.0	28.5	28.4	14.0	8
13	10°21'S 126°40'E	14	7h 45'	33.0	28.2	28.3	33.0	3
14	10°39'S 126°04'E	15	9h 20'	26.0	27.9	27.9	20.0	4

Station Number	Situation	Date	Time	Haul Distance	Surface Temp.	Bottom Temp.	Transparency	Water Colour
15	10°47'S 125°51'E	June 16	8h 3'	27.0m	27.9C	27.9C	20.0m	4
16	11°05'S 125°34'E	16	16h	25.0	28.2	28.2	25.0	3
17	11°26'S 124°39.5'E	17	8h 10'	30.0	27.8	27.9	28.0	4
18	11°32.5'S 123°35'E	18	9h 30'	30.0	28.0	28.0	30.0	4
19	9°53'S 129°15'E	26	9h	11.0	27.6	27.6	11.0	4
20	9°54.5'S 129°33.5'E	26	13h	26.0	27.3	27.2	20.0	4
22	10°41'S 129°03.5'E	27	7h 32'	40.0	27.4	27.4	11.0	4
23	10°41.5'S 129°16.5'E	27	17h	38.0	27.4	27.4	10.0	5
24	10°47'S 129°10'E	28	7h 55'	35.0	27.5	27.4	12.0	5
25	10°53'S 128°51'E	28	15h 50'	35.0	27.6	27.6	17.0	4
26	11°00'S 128°44.5'E	29	8h 22'	35.0	27.7	27.7	11.0	5
27	11°02.5'S 128°44'E	29	16h 45'	36.0	27.8	27.8	15.0	5
28	11°06'S 128°25'E	July 1	7h 15'	44.0	27.2	27.2	12.0	5
29	11°04'S 130°34'E	12	14h 55'	38.0	26.2	26.2	5.0	9
30	11°11.5'S 130°45'E	13	7h 55'	22.0	26.1	26.1	2.0	11
31	11°07'S 131°09'E	13	15h	23.0	26.0	26.0	1.2	11
32	11°06.5'S 131°10'E	14	8h 10'	24.0	25.0	25.0	2.0	11
33	10°59'S 132°06.5'E	14	17h 10'	29.0	25.4	25.4	4.0	10
34	10°59'S 132°06.5'E	15	8h 30'	29.0	25.4	25.4	6.0	9
35	10°59.5'S 132°01'E	15	11h	35.0	25.6	25.5	10.0	8
36	10°55'S 132°06'E	16	10h 10'	37.0	25.6	25.6	5.0	9
37	10°50.5'S 132°10'E	16	12h 10'	44.0	25.7	25.7	5.0	8
38	10°54'S 132°13'E	16	13h 50'	35.0	25.8	25.7	5.0	7

Station Number	Situation	Date	Time	Haul Distance	Surface Temp.	Bottom Temp.	Transparency	Water Colour
39	10°57.5'S 132°16'E	July 16	15h 15'	23.0m	25.6C	25.6C	3.5m	9
40	11°38'S 135°48'E	18	12h	35.0				8
41	11°28.5'S 135°00'E	19	11h 50'	36.0	25.1	25.1	10.0	7
42	11°29'S 135°04'E	19	15h	36.0	25.2	25.1	10.0	8
43	11°29'S 135°11.5'E	26	10h 35'	30.0	25.3	25.3	7.0	9
44	11°29'S 135°21'E	26	13h 45'	38.0	25.6	25.6	7.0	8
45	11°32'S 135°22.5'E	26	15h 30'	38.0	25.6	25.6		7
46	11°33'S 135°33'E	27	8h	33.0	25.3	25.3	10.0	9
47	11°29.4'S 135°48.5'E	27	11h 35'	36.0	25.5	25.5	6.0	8
48	11°22'S 135°01.5'E	27	15h 10'	36.0	25.5	25.5	8.0	8
49	11°10'S 136°19'E	28	9h 50'	35.0	25.6	25.6	11.0	8
50	11°10.3'S 136°22.5'E	28	11h 50'	31.0	25.9	25.7	9.0	9
51	11°07'S 136°27'E	28	13h 30'	31.0	26.1	25.9	4.0	9
52	11°04'S 136°29.5'E	29	8h 35'	32.0	25.9	25.8	4.0	9
53	11°00'S 136°29.5'E	29	9h 52'	39.0	25.9	25.9	6.0	9
54	11°06'S 135°13.5'E	29	13h 10'	38.0	25.7	25.6	11.0	7
55	11°25.5'S 135°37.5'E	30	14h 45'	35.0	25.7	25.6	7.0	9
56	11°31'S 135°14'E	31	8h 30'	28.0	25.5	25.5	7.0	9
57	11°28.5'S 135°10'E	31	10h 35'	36.0	25.5	25.5	8.0	9
58	11°31'S 133°50.5'E	Aug. 2	13h 12'	28.0	25.2	25.1	10.0	7
59	11°31'S 133°50.5'E	3	8h 30'	30.0	25.1	25.1	8.0	8

Table 1. Detail of the occurrence of chaetognaths.
F.O. Frequency of occurrence, M.N./H. Mean number of individuals per haul.

Station Number	1	2	3	4	6	7	9	10	11	13	14	15	16	17	18	19	20	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	F.O.	M.N. H.	
<i>Sag. enflata</i>	5	2	7	10	17	11	29	16	19		2	1			2	1	5	11	3	2	18	2	3	3	3	2	2	1	3	4	10	5	6	1	2	13	20	11	9	8	10	12	9	7	8	8	10	8	3	28	26	7	17		18	51/55	8.6	
<i>Sag. bipunctata</i>																											1																											1	1			
<i>Sag. robusta</i>			3	1	2	4	2		2		3										2		2	1			1			1	1	1			2	2	1		1	1							1		8	21	2							
<i>Sag. bedoti</i>	8	2	14	3	10	2	10	5	5								1	5	1		2	2	3	2	2	1	5	2		2	7	2	5		2	3	3		1	1	4	2	2	2	4	7	3	10	3	10	1	2				41	3.9	
<i>Sag. serratodentata pacifica</i>	1														1																					2			1										1				5	1.2				
<i>Sag. neglecta</i>			5		5	4	4	6	3	1												1	2			1			1				1				2				1				5	1		1							19	2.4		
<i>Sag. regularis</i>									1		1						4													1																							2				5	1.8
<i>Sag. spp.</i>	4	4	15	6	9	12	8	6	6		3	3		1		3	5	31	13	10	27	3	13	17	3		1	1	6	9	5	1	2	1	4	2	12	10	2	7	19	2	3	2	4	10	14	9	8	6	11	3	10	2	6	51	7.3	
<i>Pterosag. draco</i>										1																																															1	1
<i>Ktta. pacifica</i>			10	2	7	5	4	8	8	2								3	1	1	4	2	5	3	2					2	2		1			4	6	1	1	2		8	7	10	6	16	15	10	2	17	2		1		1	36	5	
Total	18	8	54	22	50	38	57	41	44	4	9	4	0	1	3	4	15	50	18	13	53	10	28	26	10	4	10	4	9	19	26	9	15	2	8	26	45	23	15	19	34	24	22	21	23	41	47	38	16	62	40	12	32	2	33			

Table 2. Detail of the occurrence of appendicularians.
F.O. Frequency of occurrence, M.N./H. Mean number of individuals per haul.

Station Number	1	2	3	4	6	7	9	10	11	13	14	15	16	17	18	19	20	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	F.O.	M.N. H.
<i>Oik. longicauda</i>		3	46	106	122	65	4	3	21	16	10	11	20	39	17	32	68	13	12	16	14	12	27	32	7		1		1	24	20	5	8	11	57	6	45	16	17	31	40	11	16	35	28	95	61	74	125	47	44	50	95	12	23	52/55	33
<i>Oik. fusiformis</i>					1					3	11	1	21	11	13		1	1						22										1				1	1						5					13		1			16	6.7	
<i>Oik. fusiformis</i> <i>f. cornutogastra</i>		6	13	20	31	13	4	1	7	4	3					1	5		6	4	4	3	5	3			1		1	5	6		4		3	1	10	3	1			2	2	6	11	26	27	12	39	7	2	3	14	5	2	42	7.8
<i>Oik. intermedia</i>																														13																							1	13			
<i>Oik. dioica</i>		7	2	3	4	15				1								2								1	2	6								3			1			1			2	3	1	2	8	3				20	3.4		
<i>Oik. rufescens</i>		25		11	6	1		1	2	7	5	2	1		4		1		3						7			1	2	32	31	15	27	9	32		2	1	1	1				10	16	29	11	6	22	21	1			4	33	36	10.6
<i>Oik. parva</i>						1																																															1	1			
<i>Oik. cophocerca</i>				1			2	4	10	1	2				8			1		1																																		9	3.3		
<i>Oik. spp.</i>			4	5	3			1	6	2	4	2	3	2	2		2	1	2		3		5	2	1	2				1	5	1	1	1			2				3		1			1	1		8	1	1	1	3	1		35	2.4
<i>Megal. huxleyi</i>						1		1			2																																									1	5	1.2			
<i>Steg. magnum</i>					1	1			1	1																											1																5	1			
<i>Frit. haplostoma</i>				2		5				2	2			2			1			1					1																		1	14						1	11	2.9					
<i>Frit. abjornseni</i>										1		1		1																																								3	1		
<i>Frit. arafoera</i>													1																																										1	1	
<i>Frit. formica</i> f. <i>digitata</i>										1	1	2																																										3	1.3		
<i>Frit. pellucida</i>										2																																													1	2	
<i>Frit. borealis</i> f. <i>sargassi</i> large ind.									1					2					2																																			3	1.7		
<i>Frit. borealis</i> f. <i>sargassi</i> small ind.		1	15	36	16	19	2	3	4	6	4	1	6	9	9		2	11	26	11	8	17	8	9						3	2		1	1	1	3	8	8	1	3	17	1		8	8	20	17	4	4	5	4	18	14		44	8.5	
<i>Frit. spp.</i>														1										1																															2	1	
<i>Tect. fertilis</i>																	1																																						1	1	
<i>App. sicula</i>		8		1				1	1		2			2	1	1		7	13	9	2			4						1	3	3		2	1		6	1	6	3	6	2	1		7	13	5	5	2		34	2		32	4.8		
<i>Kowal. tenuis</i>				1																																																			1	1	
Total	0	50	80	186	184	121	12	15	53	46	47	19	52	69	55	34	81	36	64	42	31	32	45	73	16	3	4	7	4	66	80	24	41	25	94	10	77	29	26	40	67	16	21	60	85	189	122	103	204	82	54	127	131	23	60		